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## REGULARS

Special Report: Tcitung's new micro
.5
Full details of the challenger to the BBC computer
News
H.s. seene . . . . . . . . . . . . . . . . . . . . . . . . . . . . 30

Our man in California reports

## Solewtire charts

32Our exclusive guide to arcade and non-arade games, plus Top 10s for all popular micros

Classified eds start on 35

## SOFTWARE REVIEWS

Useful.a. and Fun . . . . . . . . . . . . . . . . . . . . . 15
Utilities and games for the Commodore 64, BBC and Oric/Atmos
Whet will they learn? . . . . . . . . . . . . . . . . . . 18
Your computer as a teacher, "with software for the Spectrum and Oric

## For the fun of it <br> 22

New games for the Sord M5 and the TI-99/4A

> Therg's a free 24-page supplement in this issue for usert of the yis-20 that commodery this is whpti inside it:
> - abyers oulde to add-ons
> - a Pixel-pad screen deslemer for the commodore 64

## - how to creote qood-fooking ormphics for Yourgomes

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- free-to-enter eompetition for Bubtele
Bus foFrware
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- a game with a difference for the WIS-20


Spectrum
...............................
 sort the mail and play patience

## Oric

24Two games to play: find the keys to escape... eat the Mouldrish to lint

## VIC-20 and Commodore64

...you'll find listings for these two computers in our 24 -page supplement

Readerss we welcome your programs, articles and tips - see the panel in this issue for details
Software houses: send your software for review to the editor. Contact him for competitions and other promotions, as well

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# STAND BY T.L. APPROACHES. .THE NEW 3D MINDBLOWER FROM VORTEX. 



4 The superb 3D effect ... gives an impression of vasiness
which I certainly hove nol seen in any
other game. \$9 Home computng weekiy
66 Striking 3D graphics ...s
SINCLARUSER
66... enough to keep you playing until the wee hours. Superb. 99

POPULAR COMPUTING WEEKIK


PIEASE RUSHME
$\square$ ANDROID TWO SPECTRUM $48 \mathrm{~K} \quad £ 5.95$ $\square$ ANDROID ONE SPECTRUM $16 K$-48K $£ 4.95$ TOTAL VALUE

Gamer sunable lor keybourd and joystick
NAME
ADDRESS
tocsumannath H0cramesnath
66.... highly addictive and first rate value for money. Highly recommended sy CRASH

## Can Tatung tackle the BBC micro? Read Paul Liptrot's full report on its aims and what the Einstein offers

The Elnstein computer with Tatung's colour monitor


# Revealed: the Einstein micro from Tatung <br> Tatung is aiming to hit computers 

like Acom's BBC micro with its new Einstein, which offers 64 K of RAM, a 3 in disc drive and 67 typewriter-style keys for $£ 499$.

Sates boss Mike Bayliss said it would cost an extra $£ 560$ to give the $£ 399$ BBC computer the same features.

Made and designed in Britain by the UK arm of a giant Taiwanese company. Einstein deliveries stant in June and 50,000 are planned for this year.

Dr Bayliss said the Einstein was an up-market computer designed for the home enthusiast, education and small business. An Apple IIE with similar specification would be $£ 1,010$.

The Einstein's disc operating system handles programs running under CP/M, the industry standard system for business software. The DOS and BASIC are on a dise supplied with the computer. This is to allow other languages to be used without losing memory to a built-in BASIC.

Asked about the Amstrad computers, launched a week earlier, technical boss Roy Clarke said the Einstein was 25 per cent faster, the BASIC was more extensive, the keyboard more reliable and longer lasting and more RAM was available to the user.
When BASIC had been loaded, 48 K could be used and just over 43 K was available with both BASIC and the DOS loaded.

Amstrad's two cassette computers had 42 K gvailable to BASIC. The available memory in its two disc models was not known. Amstrad's prices are £329 for cassette model with colour monitor and $\$ 529$ for 3 in disc model with colour monitor. With green screen the prices are $£ 100$ lower.

Dr Clarke said the Einstein was intended to fill the gap bet-

## Einstein BASIC keywords

| ABS <br> ADC anuloguel <br> dipital <br> AND <br> APPEND <br> ASC <br> ATN <br> AUTO lane numbering <br> ACOL beckground colour <br> BEEP <br> gINs <br> BTN <br> CALL. <br> CHAIN <br> CHRS <br> CLEAE <br> CLOSE <br> CLS <br> CONT <br> cos <br> CRBATE file <br> DATA <br> DEEK <br> DEFine function <br> DEGiees <br> DELete <br> DIM <br> DIAectory <br> DOKE <br> Dos <br> DRAW <br> DRIVE <br> ELLIPSE <br> ELSE <br> END <br> EOF <br> ERAse <br> ERRer | ERR5 <br> ERL erpor line <br> EVALuate <br> EXP <br> FILL <br> FMT fomat <br> FN function FOR <br> GCOL praphics colown <br> GOSUP <br> mern <br> HEXS <br> HOLD pase 10 <br> NCH =et for key inpur <br> ENCHS <br> INPut from pont <br> INPUT <br> INPUTE <br> INTeser <br> IOM Vo modify <br> KBD keyboand <br> KBD4 <br> KEY define <br> fuostion leyry <br> KEY LST © ounchti <br> of function mantenti <br> LEFTS <br> LENph <br> LET <br> L.15T <br> LSTPrint <br> LN naturnl loy <br> LOAD <br> LOCK <br> LOG <br> MAGrify <br> MGE merje | MIDS <br> MODules <br> MON infe monitor <br> MULS multiple <br> of string <br> MUSIC <br> NEW <br> NEXI <br> NOT <br> NULL <br> OFF <br> ON <br> ON + GOTO <br> ON... GOSUE <br> OPEN dite file <br> OR <br> ORIGIN <br>  <br> PEE <br> P <br> ROT <br> Point <br> POKE <br> polyma <br> FOP <br> POSame of cis <br> PRINT <br> PRINTAT <br> PROTret <br> PSG mind dime <br> PTR priner <br> RLIDta <br> READ <br> REM <br> RENmm <br> RENUM <br> RESTORE <br> RETURN <br> RIGHTB <br> RND | RST mond <br> RUN <br> SAYE <br> SCRNS <br> SEP redef. <br> separation <br> SGN <br> SHAPE <br> SIN <br> SIZE memory lofi <br> SPEED cutput delizy (0-2:33) <br> SPRITE <br> SPRITE OFF <br> SOR <br> STEP <br> STOP <br> STR <br>  <br> 4月 <br> TAN <br> TCOL tem oolour <br> TEMPO <br> THEN <br> Tis not/prition tion <br> 10 <br> UN1.OCK file <br> UNPLOT <br> VAL <br> UDEEK <br> VDOKE <br> VERIFY <br> VOICE <br> VPEEK <br> YPOKE <br> WAIT phune <br> WIDTH of lent KOR <br> ZONE prim area |
| :---: | :---: | :---: | :---: |

ween computers costing $£ 200$ $£ 300$ and $£ 1,000$. He said "It will be bought by people upgrading from micros like the Spectrum, those who want a better computer from square one and by businesses.
"There is so much talk of jam tomonow. What we say is avaiable will be available, not sometime next year or maybe never. And there's more than one of fender."

The processor Z80A, used in the Spectrum and others, running at 4 MHz . Screen display is handled by a separate 16 K Texas Instruments chip and the operating system is in an 8 K ROM.

Display: 56 alphanumeric characters and 160 symbols - in a $5 \times 7$ grid - all of which can be redefined, pius 32 sprites, four in one line.

No. of horlz vert. chars coloart pixels pixels

$$
\begin{array}{llll}
16 & 256 & 192 & 40 / 32 \times 24
\end{array}
$$

Keyboard QWERTY with graphics symbols etched on fronts, eight function keys, 11 control and cursor keys.
Dise drive made by Teac, each 3in disc has a claimed capacity of 250 K per side, of 200 K when formatted. Tatung branded dises are to be available. A second drive, costing $£ 149$, can be installed above and to the right of the keyboard A separate drive will be $\$ 189$ and a separate twin drive is planned.
Language/operating rystem: Tatung/ Xtal BASIC, written by Crystal Research, allows users to add to the BASIC keywords and
the 32 error messages. It includes a full screen editor. Tatung says the DOS is designed to be easily understandable by first-time users.
Inpui/output RS232-C, Centronics, four-channel analogue-to-digital converter for joysticks etc, eight-bit user por, externel disc drive connector, UHF TV, YUV/RGB for monitor, and the Tatung "Pipe" - a 60 -way gentral purpose connector.
Soundt three channels, plus noise, with volume control and amplitude, pitch and evelope control in BASIC. Speaker measures $31 / 4 \mathrm{in}$ by $21 / 4 \mathrm{in}$.

Softwarec games would cost £7-£15 and business software up to $£ 250$. Companies writing for the Einstein included: A\&F, Kums, Gem Software, Crystal, Leasalink Viewdata and Micro Simplex. At least 50 would be available straight away.
Perlpheralc: joysticks, $£ 5$ : Tatung branded Shinwa dot matrix printer with Tatung ROM, S229; internal and external disc drives. As a launch offer there will be vouchers for $\$ 10$ off the primter, extra drive and Tatung's 14 in colour monitor, usually $£ 240$. Promised soon: a Prestel sotware upgrade. At the end of the year there would be a unit for 80 column display, greater resolution, and more sprites, plus a speech synthesiser.

Tatung has an annual turnover of $\$ 500 \mathrm{~m}$ and 25,000 employees - 800 of them in the UK. It makes home appliances, power plant and industrial equipment and has 30 subsidiaries, half in China and the rest in Asia, South Africa and Europe.

The Einstein was designed in its Bradford laboratory and is made in Bridgenorth, Shropshire, which also manufacturers products fike Deccacolour TV sets. Tatung bought the plant from Decca in 1981 .

Rabbit<br>From fromt page

he may have taken pills with drink:
Police searched with rracker dogs and Mr Savage's body was found slumped against a tree by a man walking his dog. He had hung himself with his belt.
Miss Lamont revealed that Mr Savage had his stomach pumped out aftier an earlier attempt to kill himself with an overdose. And two other cars, a BMW and a Jaguar-Daimer, had been badly damaged in recent accidents with Mr Savage at the wheel.
Miss Lamont said: "He had personal problems and when your mind isn't together they seem enormous. He felt his world was falling apart. I I don't know if he was schizophrenic, but this is the sort of thing that bappens. Perhaps the car crash was the last straw.
I had spoken to him that morning and he was fine. Obviously his mind was unstable and something clicked and he just couldn't cope. It
was nothing to do with Rabbit - the company is doing fine.
"His ex-wife broke the news to me. I was absolutely sick. I can't explain the feeling. I was so totalily shocked that I feit ill."

On the surface Mr Savage seemed to have everything to live for. A few days before his death, he told HCW editor Paul Liptrot that Rabbit was thriving and spoke of his personal plans. Rabbit's premises near Wealdstone also includes Soft Copy, trade name for its own cassette duplication and blank tape operation.

Mr Savage, who trained as en communications engineer, was in the process of buying a $£ 200,000$ house in Hertford. shire and also planned to remarry. He recently had a hair transplant.

Miss Lamont, formerly an assistant manager British Home Stores, joined Mr Savage in a technical staff agency which later turned to computer retailing under the name Cream Computers, Rabbit was formed about three years ago and computer sales ended.

# You could be on our pages 

## We welcome programs, articles and tips from our readers. If you feel that your work meets our standards, please submit it to us for

 consideration for pubilcation.- Programs must always be sent on cassette. Listings are helpful, but not necessary. check carefully that they are bug-free. include details of what your program does, how it works, variables you have used and hints on conversion.
- Articles on using home computers should be no longer than 2,000 words, Don't worry about your writing ability - Just try to keep to the style in HCW. Articles most likely to be publlshed will heip our readers make better use of their micros by giving useful ideas, posslbly with programming examples. We will convert any sketched illustrations into finished artwork.
- Tips are short articies, and brlef programming routines, Your hints can aid other computer users.
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Paul Llptrot, Home Computing Weekly,
No. 1 Golden Square, London W1R 3AB'

Now Rabbit has a range of 17 titles for the Spectrum, VIC-20 and Commodore 64 - about 36 products counting those available for more than one computer.

A new title, Stalag 1, a comic arcade game for the Commodore 64, has just been released and Vortex, an arcade game for the Spectrum and Commodore 64, is due out in mid-May.
Miss Lamont said she owned 51 per cent of Rabbit's shares and Mr Savage owned the remaining 49 per cent. A will had not yet been found, but if it turned out that Mr Savage's shares went to his mother Miss Lamont said she would raise the money and offer to buy them. Rabbit's three-strong board consisted of Miss Lamont, Mr Savage and Miss Lamont's father, Arthur.

Miss Lamont said: "We are a good, solid company. We are in about the middle of the range. We are not like lmagine or the rest of them and we are not down at the bottom. But I don't really want to be in the big league."
Mr Savage, who lived in Willesden, was a car enthusiast. As well as the BMW, the Mercedes and the JaguarDaimler, he also drove a restored E-type Jaguar.

Asked if personal relationships could have led to the tragedy, Miss Lamont said: "Alan had been unstable for a long time and a lot of people passed through his life. There's no blame to put on anybody."
Paying tribute to him, she said: "OK, he had a troubled mind but he was a super person. A lot of people cared for him.
"He had a flair for the business. He gave a lot to Rabbit and he got a lot of enjoyment out of it. He had everything to live for but

## Help for your buciget

Now available for the CBM 64: Cash Controller, to help you with budgeting and banking. Three areas of finance are catered for by this program: bank account, budget and mortgage. Printouts of statements and budgets are possible and data may be saved to cassette or disk.

Richard Shepherd Software has converted this program from the Spectrum, and both CBM 64 and Spectrum cassettes cost $£ 9.95$. Commodore disk version costs $£ 14.95$.
Richard Shepherd Software, Elm House, 23-25 Elmshott Lane, Cippenham, Slough, Berks
because of his mental state he could not see it."

Rabbit's software director, Terry Grant, said: "I was devastated. Everyone here is upset but we are all getting on with out work."

## Cooking

## From fromt page

can you do to attract them?
"At first I thought of a recipe book, but you can't take a computer into the kitchen. Then I thought: "What is the most boring job you have to do?' That's deciding what to cook.
"Most women have 200 or 300 recipes in their minds, but you forget them and end up having chips every day.'
What's to Eat?, on cassette for $£ 9.95$ and a dise version at £12.95, is designed to plan meals for everyday and for special occasions. When the choice is made - from a claimed 20,000 possible combinations - the menu is displayed, ingredients listed and a shopping list produced.
The program was written largely by Mr Smith with data from his wife, based on her years of cooking for the family.

Mr Smith, 54, a former electronics engineer, and Mrs Smith, a former civil servant, also produce business software. They call themselves Shumwari Associates. Mr Smith said Shumwari meant small friend in a south-east Asian language.

Bug-Byte's Computer Cookbook is in : two-cassette pack - one for the index and the other for the recipes - and costs $£ 9.50$.

Mr Hoare said his program started with a request from a friend for ${ }^{\text {a }}$ popular recipe. He said: ${ }^{51}$ As a joke, 1 tried to put the recipe into the computer."
After months of work, and the promise of a Bug-Byte contract, he has finished a program which now contains more than 80 of his recipes in imperial or metric measures and for any number of people up to 200. Wines to accompany the dishes are also given.

Bug-Byte says the program is more than just a cookery book. Using the index you could, for example, tell the computer you had some pork in the fridge and the program will select suitable recipes.

It will also list recipes by category, such as starters and desserts, simplicity and country of origin.
Shumwari Associates, 12 Marlin Cl, Marlow, Bucks SL 7 $2 A J$
Bug-Byze, Mulberry Hse, Canning Place, Liverpool LI $8 J B$


## Hall of Mirrors by David Nowotnik

Here's a game for all Spectrum users which should be both fun and educational. The main purpose is to demonstrate the principles of reflection in mirrors. And this you'll have to grasp quickly if you're siming 10 achieve high scores.

When the game starts, the hall of mirrors is drawn and the computer gives you an gerial view. The walls of the building ar lined with mirrors which are arranged to alternate in the direction they face. More mirrors will appear inside the hall; some will always appear in the same place, while others are placed randomly, so each gatne is different.
There is one exit to the hall, at the top of the screen. By the exit is a colour scale, which is your target. The object of the gnme is to direct a beam of light such that it eventually hits one of the coloured boxes. If you can, you will obviously go for the green box for the maximum score.

On the screen you'll see flashing "greater than" symbol on the left of the hall. This ds the point from which the beam of light will emerge. It stasts off going horizontally across the screen. You have to place a number of mirrors in the beams path to defiect the light onto the target box.

## How it works

100-150 move character set from ROM
160 redirects CHARs 170-210 define new characters 240-290 machine code to block move attribute file
$1000-1250$ set up the baard 1260-1280 position set mirrors 1290-1340 position zandom mirrors
1500-1810 select positions and place mirrors onto the boatd 1815 machine code to copy the titribute file
1820-1920 draw the light bearn 1950-1990 retlect the tight bean 3000-3060 score messsige 5000-504t Jight beam plotting coutine

You can place up to Jive mirrors in the hall. To place a mirror, yot'll need to enter the horizontal and vertical coordinates, and the direction of the mirror.

## Male variables

a,b READ variables
it atiribute check
c,ल INPUT variables for mifsor sype
h,hs INPUT for horizontal position of mirros
fos, ms' mirror chracten

- the mumber of dots to be photisad.
Exore the runaing total
Virs INPUT for wertical prottion of mirror
$x_{n} y$ co-ordinates of the random position mirrors
$x 1, y 1$ used to position calculetion
a a dummy variable used when calling muchine bode


To heip you with the coordinates, there are letters along the sides of the hall, and the inside of the hail is mapped out like a chess board. So, decide where you want to place mirror, enter the co-ordinates of that postion when you get the screen prompt, and tell the computer which mirror sype you want. This game uses double surface mirrors; that is,
they will reflect on both sides.
Once you have placed all the mirrors you want (up to a maximum of five) the light beam will be "fired". Bus to let you see what happens, I have dramatically reduced the speed of light! The beara will leave a trail to let you see where it has been.

And if you've planned the positions of your mirrors well, the light beam should
eventually hit one of the whoured boxes. However, if you find that all your plans have gone wrong, then you can stan again by pressing CAPS SHIFT and S.

After a few goes you should be abie to achieve the maximum score most times. And you should have grasped the ancient physics principle, that "the Angle of incidence equals the angle of reflection".


There are two small pieces of machine code in this game, so once you've entered the listing into your Spectrum, do SAVE it on tape before you attempt to RUN it, just in casc. You only need one slight mistake with machine code to give you a crash, from which the only recovery is to pull out the plus - and lose the program!

Screen dump of Hall of Mirrors

- In mearly all ceses, the CAPITALS in PRINT statements should, unless text, be entered in GRAPHICS mode. In Patience these are indicated by gn anderline.

Round ${ }^{\text {HALL DF MIRRORS }} \mathrm{E}$ core 2


## The Sorting Room <br> by A.G. BIrd

Your job as a Post Office employee is to direen the mail in the sorting room.

Due to wear and tear on the conveyor belt, however, forking mail does tend to ger harder and harder. But as atrusted employee you must do your best.

## How it worle

## 15 keyboard BEEP

20-60 initialise
100-179 start game, part of con-
veyor chopped
180-240 draw scene
250-280 name end eddrest on

290-300 letter slide
400-540 main loop for letter's journey
$700-710$ subroutine for letter down slide
1000-1100 horizontal movement on conveyor 1
2000-2100 correct box check $2500-2520$ end of 部me routine 8000-8010 instruction
9000-9040 graphics

## Variables

4 , LS first and fourth, second and third conveyor betus
bs eity
x.y letter co-ordinates n,b,e substring numbers sorf number of letters
a maia loop
m part of conveyor chopped
I belts two and three movement

- slide drop

1 cominter for slide drop
e correct location (seore)

## Patience by Tim Lang

This is a version of Patience which demonstrates the use of strings and arrays to set up a pack of cards, shuffle and deal and keep track of the play.

Note the use of the hash character to print into the lower portion of the screen instead of using INPUT which requires the ENTER key to be pressed after each entry.

## How It works

100 instructions - expund or leave out
1000 DIMenson arraya and call subroutine at 1560 to set
user-defined graphics
1010 shuffle and deal cards
1150 main loop
1180 detect last card
1370 detect a wrong entry and loop back
1410 subroutine to change $J, Q$ ete. into numbers
1469 calculate score and offer new game.

Listing for Hall of Mirrors

```
    10 REM Hall of Mirrors
    20 REM by David Nowatnik
    30 REM Feb. }198
    40 REM
    S0 REM
    60 REM
100 CLEAR 30000
110 FOR i=31000 TO 31011
120 READ a: POKE ina
130 NEXT i
140 DATA 33,0,61,17,0,124,1,0,3,237,176,201
150 LET zq=USR 31000
160 POKE 23607,123
170 LET aw.5: LET }x=3249
1日0 FOR im0 TO 7
190 LEET a=a*2; LET b=128/a
200 POKE }x+i\mathrm{ ,as FOKE }x+i+9,
210 NEXT I
220 LET n$=CHR变 126
230 LET ल%=CHR悉 127
240 FOR 1=30002 T0 3002S
250 READ as POKE 1,#: NEXT i
260 DATA 33,0,88,17,148,117,1
270 DATA 0,3,237,176,201
2B0 DATA 33,148,117,17,0,88,1
290 DATA 0,3,237,176,201
500 REM Score
510 LET 玉CORE=0! LET roundm!
1000 REM Set up the board
1010 PAPER 7: INK 0: BORDER 7% CLS
1020 PRINT TAB 日s "HALL OF MIRRORS"*" Round "sround," Score "pscore
1030 PRINT AT 4;4;: FOR i=1 TO 12% PRINT INK 1;m$; INK 2;n%:% NEXT i
1040 FOR i=5 TO 18 STEP 2
1050 PRINT AT i,4; INK 2;n%:AT i+1,4; INK 1;ms
1060 PRINT AT i, 27; INK 1;m*;AY i+1,27 INK 2;n*
1070 NEXT &
1080 PRINT TAB 4;y FOR 1=1 TO 12: PRINT INK 2;n$; INK 1;ms;& NEXT i
1090 PRINT AT 4,12:"
1100 ERIGHT 1
1110 FOR i=5 TG 18STEP 2
1120 FOR }y=5\mathrm{ TO 26 STEP 2
1130 PRINT AT i, j:N "sAT 1+1,j+1%" 10
1140 NEXT j: NEXT i
1150 BRIGHT O
1160 PRINT
1170 PRINT TAB 5: "ABCBEFGHIJKLMNOF-QRSTUV"
1180 PRINT AT 3,12;
1190 FOR j=1 TO 4: FFRINT FAFER j5" "ys NEXT j
1200 FOR j=4 TO & STEP -1& PRINT PAFER j:" "; : NEXT j
1210 PRINT AT 2,12;"12344321'*
1220 FOR j=5 T0 18
1230 PRINT AT j,28;CHR* (j+60)
1240 NEXT j
1250}\mathrm{ FRINT AT 16,3; FLASH 1%">"'
1260 PRINT AT 5,11; INK 1;CHR年 126;AT 5,20% INK 2;CHF$ 127;AT 日,15; INK 2;CHR** 1
27: INK 1:CHR$ 126
1270 PRINT AT 10,14; INK 2;CHR* 127;AT 10,17; INK 1;CHR* 126
12g0 FRINT AT 12,13; INK 1;CHR* 126;AT 12.18: INK 2;CHR* 127
1290 FOR i=1 TO 12
```



```
1310 LET y=11+INT (RND*10)
1320 IF SCREEN$ ( }x,y\mathrm{ )<>" m THEN GO TO 1300
13.30 LET a=1NT (RND+1.5) % PRINT AT }x.y\mathrm{ ; INK a:CHR$ (25+a)
1340 NEXT %
1500. REM Main Routine
```

```
1510 FOR i=1 TCl 首
1520 INPUT AT @,0ş("Mirror *gig".Enter horizzontal coardimates (A to V) *)
! LINE, h旁
1540 IF LEN h*<<1 THEN GO TD 1E2G
1550 LET h=CQDE h娄: IF h>90 THEN LET h=h-32
1560 IF h<65 OR h>曾6 THEN GO TO 1520
1570 LET h=h-60
1500 FOKEE 2ड168+h,184
1590 INFUT AT D, ##̣ ("Mırrar "giz;". Enter vertıcal coardınates (A ta N) ");
LINE V*
1410 IF LEN v$<>1 THEN GO T0 1590
1620 LEY v=CODE v*: IF v>90 THEN LHET v=v=32
1630 IF v<゙65 DR v>78 THEN GO TO 1590
1640 LET V=V -60
1650 PCHKE 22556+v*32,184
1660 LET att=ATTR (v,h)
1670 IF SCFEEN* (V,M)=CHF
```



```
1690 PAUSE 200
1700 POKEE 2.516B+h,56: PGKE 22556+v*32,56
171060 TO 1520
1720 FRINT AT V,h; FLASH 1:" "
1730 PRINT AT 21,0;"Mırror ";is"* Enter marror "
```



```
1750 IF LEN c胗<>1 THEN GO TO 1740
176Q LET E=CODE c*-4B: IF E<1 QR c>2 THEN GO TO 1740
1770 PRINT AT 21,0%%
1780 PRINT AT v,h; INK E$CH&S (c+125)
1790 POKE 23168+h,56: POKE 22556+v*32,56
1BOD IF i< S THEN INPUT "Any more marrors {y/n> "; LINE C$: IF c$= "n"' DR C$="N"
THEN GU TO 1815
1810 NEXT 1
1E15 LET &q=USR 30D|2
1820 EEE 1,1% LET h=5: LET v=1G% IMNK 1
18SG LET y=43% LET x1=1| LET, y1=0
1840 FOR 1=35 TO 39
1950 PLOT 1,yt NEXT 1: LET x=1
1960 IF INKEY$%"S" THEN PALISE 200: GO TO $000
1970 LET zq=uSR उD#14: LET att=ATTF (v,h): IF att-5% DR att=120 THEN GO T0 190%
18日0 IF att=57 DR att=58 THEN Ga TO 1950
1890 60 TO 30DO
1900 PRINT AT v,hs ERIGHT (att=120)s" m
1910 LET n=日: GO SLIB Sص|0! LET h=h+%1: LET v=v=y1
1920 GO TO 1860
1950 INK att-56: LET n=4: GO 54B 5000
19夕0\ LET :#x1』 LET x1=y1: LET y1=a
1970 IF att=5B THEN LET x1=-x1: LET y1=-y1
1980 Ga SUB 5000: POKE 2252a+h+32*v,att
1990 LET h=h+x1: LET v=v-y1: GO TO 1840
3000 REM Increment score
3010 LET score=5core+att/g
3020 PRINT #1;" Your score in round "iround;" was "gatt/G
3040 PAUSE 400
30S0 IF round<S THEN LET round=round+1: GD T0 1000
3060 CLS & PRINT AT 5,5; "Your total was ";scoreg" ponnts."
4990 STOF
5000 FOR 1=1 T'0 n
5 0 1 0 ~ P L D T ~ x , y ~
5020 LET x#x+x1: LET y=y+y1
EOSD NEXT í
5040 RETURN
```


## SPECTRUM PROGRAMS

## Lasting for The Sorting Room




Screen dump of The Sorting Room

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## What will they learn from these? <br> Your computer as a teacher. our experts explain how these five measured up <br> -

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## The in ar ars destribes this as a thal cayming game that devesopa <br> cadtry salles



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## Cuttong Cotton

 sord M5 $£ 23.95$Comptier Games, Goldntes Hall. Loughlont Essex IG10 2RR

Yous play the part of an Faltroad bunder, Firat you have to lay tracks to the staston and then drive the tram through the stations.

The screen is divided whto 74 blocks, ane of which is empty, exactly like thding block puziles, propalar some years brek. Each block has a track on It and you have to move them so that the train, which is movers continuausly, wan's so thid dead end, li's no good simply keeptag the train runzung as you hnve to collaet wll the passengert at the stations, fecared at the
edger of the screch, to go on to the next sereen. There are enemy traus which try to crash into you but, bul by matuputatimg the tracks, yop cat rame them crash into each other

The graphics ane very ntec and sounds wery impressive. The game has some folly cunts and the overall presemation is excellent, if you want at mend strmulating एame which also has the addictive quality of a real ume arcade game, buy thas, If is great fun to play and is relireshungly different.

## Instrict cirs

paralal ty
Rraphatr
talue for money

## 

## Step Up Sord MS E23.95

Compure Gamer, Cotdanes Hill, Loughton, Essen TOLO ?RR

The ansirucuons explain that you have to clumb 10 flehts of stairs. ump orem the obstacles or evade then with your barrier. get to the tons and escape with the fromdly LFO before your energy tuns obta You contiol a cuse fulic ligare and make ham clanb statre, Wheth tituct prish on the left edge of the atlack batron, you can make him jump, of the nght edge to make ham tatincible for el few ftconds.

Even on the first screten, there 25 a buge number of nasties, thetudng spuders, muos, spider's weth end monsters wandertn? around and, al firs, it can be
frustratirag as you lose your ahree Irves ta malter of seconds. But of you persevert, you whit eventually get ro the top to get rescued by the UFO, then there's the next screen where there's oven more splders, mice, monsters...
The characters are welt defined and stitmation ts saod. Hownwer, the spate feature is nat used to ths fullest In fact, some characters aren't ever sprites, but hardened arcade players cousd do worse than buying this mighly orpunal game.

$t \cdot t \cdot t$

## Backgammon TI-99/4A E7

Not Poiyoprics, from Stanlens, 10 Alatone Rd, Steckport Cheshire

Thus apportunty to chaslenge the T] was greeted enthuslastically by our household, but we wera soon to be disappormed.
The program contants optiont to either play agamat the computes or another player During the first attempt if the ore player game, while the compuler was considering is second move, the program crashed with a Bad Value in 2010.

The second pame I manaped to Wis, but at its end the board d.sappeared and I was informed my score was now one, meaning 1 lint woll sme garte sour ng , 1 the original gane is done on a poins systerin, the most being awarded for a backgammon Omillong this seems very steange. purticuarly gas the progrant includes afi option to double.
On my thrid altempl every thing was just goris well when the display partially sceolted of the screen und the program locked. This conldn't be cleared, 50 ) had to quat and re-load. Forsunately, several sutser quent games passed unevent frully, but the computer proved to be in fairly pedestrian and not lattogether intelligent opponeat, Ala visw of the limuled memory avastable, the program overall seems rensonable, but pas atele to offer an experienced player. Needs Extended BASIC
insiructions paryatulity
ralue for money

# For the fun of it... 

Build a railway, play backgammon... two games in this collection tested by our review panel

## Ouasimodo/ - Bono Ti-99/4A E8

Suminleas, 10 Almade Rd, Slock pant, Cl erinte
Fifse two Extended BABIC ganes fist the 1 gh surers amonr us Eaith is loaded mpara ely Quas modo reg.ir ex the use of a jaysum, ball $Q$ is tot keybuard only.
In Quasumodo you have five lives with which to survive fit many sereent as you can Thrarge beik at the war the putpose is to resture dimmels in dis rest on ench of severa iscreens yed run and ump a. ing a brick wali Harards is avors are combinal orts of afrows, shenmmbalis a.ad holes in the wa.l Ponts are scored for ring ng a beil or rescuing mader
O Bence is a simple ver Gdjollye kathe Yolt man start ar fle top of is pyramid of whes. (smag fazat airow hevo in comprol the daponal movetuents he mast cravel astoss a. the cubes whenh Changes thetr we, 0 ar to van He is purstied by a snake wh in wilf take one of hiss lives ir both land in the same sube together Aftet the first screen each cube must be watted Iwice. In subseguen sereens this number trereases, if you've a black and whte TV, numbers can be shown on the cules to indicate colour changes.

## נम.5truçltons

patazb Ity
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## Shakey/

 Barrier Actack Sord M5 E8.95Comn, aler Crames, Goldimes H! ! Loughton, Esses $1 G 10$ 2RR

Snakey is a typical smake atame where you control a bingre saake that feeds on frops whits pavording socks and the ciectofied Fence. Also, as Suakey grows he tद3nces ओus owt movericmt. The snake ts very colourful. response is good, In the tiny mepury of the stundard MS. it zevi hess joypad option and dificulty levels
The second game is rather disappointing in companson. The blurb soys that in the yedr 4501, the uze ${ }^{2}$ asy cosmuc peace is about to be shattered by barbanans, the uncouth warriprs
of the dreaded Oasys Squadront, You, at the ccammander of the 17th zone Defence Batiolion. must prevent them from destimyllig four thyp and owernanning tur sechors of the Ralars, and so on Seandsa incredibls ckialing doesn I irt Weell, it's a s.mple vertioal screl) n8 eame lour ship at the top of the sereen can be mored. teft and night, By pressing I ort the altack huttor sou can clear a path, Granducs are mimple and sound is boring.
To conclude, pot a bad palacage, second garme could instructions playability graphics value for money

## T1-99/4A PROGRAMS

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$$
9 \mathrm{REM} * * * * * * * * * * * * * * * * * * * * * * * * * *
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$$
10 \text { PAPERD: INK7:CLS }
$$

Here＇s a treat fi －two games t you emerge we： Pyramid？And the deadly atte Spike
zo0 PLOT10,17,"1jijjjjjijji jiju jk

$$
8 \text { REM* S.RGGERS }
$$



27 RESTORE
30 GOSUS 3000
40 GOSUB 3540
$43 \quad X=4: Y=25: M X=23: M Y=8: B O=80 D 0$
47 ELS
50 PlLOT20, 2, "1k"
60 PLロT19, ぶ"l」Jk"
70 PLOT18,4, ${ }^{\text {¹ }}$ kN
日號 PLDT17,5,"1j \%\& jk"
90 PLOT17,6,"1j jk"
100 PLロT16,7,"1」j jujjh"
110 FLOT16,8,"1 jk"
120 PLOT15,9,"1j jjk"
130 PLOT14,10,"ljjjјj」」 נ」」k"
140 PLDT13,11,"j jj」 i k"
150 FLOT12,12,"1j $3 \boldsymbol{j}$ k"
160 PLOT12,13,"1j J iлj k*
170 PLOT11,14,"1jj j jjj jk"


210 PLロT9,18,"ljj 1נ」 Jk"
220 PLOTG,19,"1jjj jiji k"
230 PLロI7,20,"Ij jjjjjjijjj jj 」k"
240 PLロT白,21,"ljji jjujijijij jijjjj jjk"
250 PLDT5,22, ${ }^{\text {² }} 1 \mathrm{jjjjjj} \mathrm{j} \mathrm{j}$ j jik"
260 PLOT4,23,"Ijjjjjjj ji $j$ jik"

2日0 PLOT2G,25, ${ }^{12} j$ j $j$ "

300 PLOTZ7, 0, "BONLS"
305 PLDT27,1,"SCORE"
310 PLGTZ7,2,"LIVES"
312 PLDT32, $0,5 T R \leqslant$ ( BD )
315 PLOT $32,1,5 T R$ (5C)
317 PLDT $32,2,5 \mathrm{TR} \%(\mathrm{LI})=\mathrm{K} \$=\mathrm{KEY} \$$
31日 IF $B D=0$ THEN 1800 ELSE $B 0=80-25$
319 FLOTX,Y," "
320 IFSCRN $(X-1, Y)=105$ THEN $S C=S C+150: D=D-1: X=X-1=$ EDTロ4
ด1

$\square$
$340 \operatorname{IFSCRN}(X+1, Y)=105$ THEN $5 C=S C+150: D=D-1: x=x+1=60 T 04$
ロ0
350 IFK $\$=$ CHR $\$(7)$ AND SCRN $(X+1, Y)<106$ THEN $X=X+1: G 0 T 040$ 0
$360 \operatorname{IFSCRN}(X, Y+1)=105$ THEN SC＝SC＋150：D＝D－1：Y＝Y＋1：G0TO4 20
370 IFK $\$=$ CHR $⿻=(10)$ AND SCRN $(X, Y+1)<106$ THEN $Y=Y+1=G 0 J 046$ $\square$
3日U IFSCRN $(X, Y-1)=105$ THEN SC＝SC＋15月：D＝D－1：Y＝Y－1：GOTO4 0．0

## Oric owners type in．Will thy from the an you avoid titions of the 5h？



```
390 IFK$=CHR$(11)AND SCRN (X,Y-1)<106 THEN Y=Y-1
400 IFY=7THEN GOSUB 2000
410 IFX<#1 THEN X=2
420 PLOTX,Y,"h"
430 PLOTMX,MY," "
450 IFMY<Y AND SCRN(MX,MY+1)<106THEN MY=MY+1:GOTD510
460 IFMX<X AND SCRN(MX +1,MY)<106THEN MX=MXX+1:GOTO490
470 IFMY>Y AND SCRN(MX,MY-1)<106THEN MY=MY-1:GOTO490
48| IFMX>X AND SCRN(MX-1,MY)<1OSTHEN MX=MX-1
490 IFMX<=1 THEN MX=2
510 PLDTMX,MY,"!"
520 IFSCRN (X,Y)=33 THEN 1900
530 G0TO312
1800 PLOTX,Y,"的"#GOSUR2200
1910 LI=LI-1:IFLI<=0THEN 2100
1820 CLS:PLDT9,13,"YOLR EONUS HAS RUN OUT":WAIT5%
1830 PLOT11,15,N%:WAIT90
1835 GOSUB2600
1840 GOTO45
1900 PLOTX,Y,"m":GOSUB2200
1910 LI=LI-1:IFLI<=OTHEN 2100
1920 CLS:PLOT9 *13,"THE MONSTER GOT YOU":WAIT5\
1930 PLOT11,15,N$=WAIT90
1935 EOSUB2600
1940 GOTO45
2000 IFD<=0 THEN 2020
2010 Y=8:RETURN
2020 IF LI<S THEN LI=LI+1
2030 L-L+1:SC=SC+BO:GOSUB 2600
2035 CLS
2040 PLOT9,13,CHR$(142)+" CONGRATULATIONS"
2050 PLOT9,14,CHR$(142)+" CONGRATULATIONS"
2060 PRINT:PRINT"YOU HAVE GOT "L" PARTS OF THE LEEASI"
: PRINT
2070 PRINTSPC(14)"TREASURE":WAIT200
20日0 PRINT:PRINTSPC(11)N5:WAIT100
2090 GOTO4S
2100 CLS
2105 PRINT"YOU HAVE ND MDRE LIVES LEFT":PRINT
2110 PRINT"YOUR SCORE IS "SC:PRINT
2120 PRINT"YOU HAVE "L" PART(S) DF THE LEBASI TREASURE
213G PRINT:PRINT"GET READY FOR ANDTHER GAME"
214B WAIT 2000:GOTO 27
2200 FORT=12 TO 1 STEP-1:WAITIO
2230 MUSIC1,6,T,10
2240 NEXTT:PING
2250 WAIT100
2260 RETURN
2600 IF SC>P000 THEN D=5 ELSE D=4
2610 IF SC>16000 THEN D=G
2620 IF SC>24000 THEN D=7
2630 RETURN
2990 REM GRAPHICS + VARIABLES
3000 FGRT=46344 TO 46351:READG:POKET,G:NEXTT
3010 FORT=46376 TO 46391:READG:POKET,G:NEXTT
3020 FORT=46912 TO 46919:READG:POKET,G:NEXTT
3032 FORT=46920 TO 46927:READG:POKET,G:NEXTT
3040 FORT=46929 TO 46935:READG:POKET,G:NEXTT
3050 FORT=46936 TO 46943:READG:PDKET,G:NEXTT
3060 FDRT=46944 TO 46951:READG:PDKET,G:NEXTT
3070 FORT=46952 TO 46959:READG:PDKET,G:NEXTT
3100 DATA 20,42, 日, 20,2日,28,34,34
3110 DATA 0,1,3,15,30,60,62,63,0,0,32,56,60,62,62,62
```


## ORIC P

```
3120 DATA 12,18,12,15,12,20,34,51
3130 DATA 2,10,14,10,2,2,7,7
3140 DATA 63,63,63,63,63,63,63,63
3150 DATA 32,48,4日,56,60,62,62,63
3160 DATA 1,3,3,7,15,31,31,63
3170 DATA 4,4,31,4,4,4,14,31
3180 SC=D:LI=3:D=4
3190 N$="HERE WE GO AGAIN"
3200 RETURN
3540 CLS:PRINTSPC(11)"P Y R A M I D"
3550 PRINT:PRINT:PRINT
3560 PRINT"THE OB|ECT DF THE GAME IS TO EET IN":PRINT
3570 PRINT"THE FIRST GAME AT LEAST 4 KEYS FROM";PRINT
35日0 PRINT"THEN DN EVERY EOQQ FOINTS YOU NEED":PRINT
3585 PRINT"ONE EXTRA KEY UNTIL. YOU NEED ALL 7.":PRINT
3590 FRINT"YOU THEN ED TO THE ROOM AT THE TOP":PRINT
3600 PRINT"DF THE PYRAMID TO GET A PART OF THE":PRINT
3610 PRINTSPC(11)"&EBASI TRESURE"
3620 PLOT13,26,"PRESS A KEY"
3630 GETA$:RETURN
```

Lanting for Electric Eel

## 1 REM ELECTRIC EEL by Simon Overy G05U89000

20 TEXT：CLS：PAPER1：INKg
21 PRINTSPC（50）；CHR（4）；CH年（27）；
22 PRINT＂NELECTRIC EEL＂；CHR＊（4）
23 sOUND1，37， 1 ：SOUND2，75，0
24 PLAY3，0，1，4000
25 PLOTi3，10，＂By Simon Overy＂sWAIT30n
40 GOSUB160：GOSUB7000：GOSUB6000
50 GOSUB5000：GOSUB4000
9Ø IFYN\＄$=$＂Y＂THEN4』
95 POKE4B035，7：CLS：EXPLODE：END
160 ELS：PAPERS：PRINTSPC（76）
170 PRINT，＂You are an ELECTRIC EEL＊
1日G PRINT，＂and must swim around the m
190 PRINT，＂aquarium eating MOULDFISH＂
200 PRINT，＂（ ）but avoiding SPIKE＂
210 PRINT，＂FISH（ ），the glass sides＂
220 PRINT，＂and your own tail！
230 PRINT，＂A laud noise indicates＂
240 PRINT，＂that you must swim to the＂
250 PRINT，＂top before your oxyger ${ }^{25}$
260 PRINT，＂runs aut．Dnce you are＊
270 PRINT，＂fully oxygenated you can＂
275 PRINT，＂either turn left or right＂
276 PRINT，＂You can only surface when＂
280 PRINT，＂ın need 听 oxygen ．＂：PRINT
285 PRINT＂HINTzSpikefish have side suction ！ク！ク＂：
290 FORI＝19TO24：PLOT1，I，21：NEXTI
300 PLOT2，19，＂SCORING：－＂
310 PLOT9，21，＂The deeper the better！＂
320 PLDT2，23，＂ARROW KEYS TO MOVE＂
330 PLaT1，25，＂Hit any key for a swim．．．．＂：GETK象

350 SaUND2，T（I）＊100，0：SDUND3，T（I） 2000 ， 0
360 FLAY 7，0，1，2000：WAIT35：NEXTI
370 RETLIRN

## Pyramid iy Serm Rogers

You have just had the mis－ fortune of being transported to the inside of a pyramid from which there seems to be no escape

How it works
10－27 set colour，turn off caps， cursor and key－click．reset DATA pointer
$30-40$ branch to user－defined graphics and instructions
45 sels var ables
47－317 stl up screen
318－420 move you eround screen，check for keys，plot you on screen
430.530 move monster and theck if you have been killed
1800－1940 rouline for when bonus runs out and for when the monster gets you
$2000-2090$ check if you have enough keys if you make it to the top
2100－2140 message when all lives los
$2200-2260$ music
$2040-26.30$ roullint to see bow many keys are needed
$3000-3170$ user－defined graphics $3180-3190$ more varables
3540.3630 tnsiructions

You must run around and collect the requrred number of keys and then make your way to the top to get a part of the Lebasi treasure．

Do this as fast as possible and you＇ll get a good bonus．
By the way，watch out for the monster！

> M,Y Mala variables
> B, your position
> BO bonus
> LI lives
> SC score
> MX,MY monster'a position

Movement is by the cursor keys．

The pyramid might look a bis like a Chrisimas tree，but 1 needed the space．

When yous bonus drops below 1.000 the fourth digot will stay at 0 and so on．This will make if harder to notice when your bonus is low

## Hints on converslon

PLOT in Oric BAStic is the same as PRINT AT The Oric uses an $8 \times 6$ grid for user－def．ned graphacs compared with the $8 \times 1$ of mosi other camputers．

## Electric Eel <br> by Simon Overy

You are an eef in a large aquarium and to stay alve you must swim about eat nys one kund of fish but avording the other type．

## How it works

$20-25$ title
160－3．30 instrictions
340－340 tune
$4000 \cdot 4030$ end of game
s $0000-5910$ main game routine $6000-6170$ dzsplay start screen $7400-7010$ set game varsables $9004-9536$ uttalisat 40 and ast defined rraphics

A loud continuous noise cells you that you are short of oxygen and must swinn to the surface within a cerram lime
The deeper the Mouldi ish are the more points you will score for catung them．The eel uncreases in length every tume it eals something．
The game ends when ether your oxygen runs out，you are hit－or touched horizontally －by a Spikefish，or there are no Mouldfish left．

## Varables

SC present sure
HI high swore
OX and vates oxygen needed XC coamer for oxygen left \＆Pit，Jt pusition of ect AF，FB from，back of ecl Mr（ 5,15 ）posilion of Mouldfish MC counter for Mouldfish left EX，EV dieection of ech J（I）tune array

## Hiats on conversom

Leave oull all the PGKts and use your own compuler＇s clock． Omut double height tile（CHRS5
4 and 27）and change 6000－6170
to sull yous own screen
POKE 48035， 7 1urns CAPS off POXE（hash） $26 \mathrm{~A}, 10$ turns off keyceck and cursor
DOKE 630， n controls interrat rimer
CHRTs 91， 92 and 93 are the user graphes

4000 FORI＝100TOS00STEP2
4010 5OLND $1,1,10$
4020 NEXTI
4030 CL S：PAPERS：INK 4：PRINTCHR（4）：7AP

4050 IFSC＞HI THENHI＝SC：HI条＝RIGHT＊（STR＊（SC），LEN（STR（SC）
，-1 ）
4060 PRINTCHR ${ }^{(1)}$（4）
4070 PLOT1，20，＂Hit＇y＇for play，any other to stop．＂
4080 K\＄＝KEY\＄：GETYN＊＊RETUFN
5000 DOKE630，1600
5月GB REPEAT
5015 RR＝RND（1）
5016 IFRR： 0 ． $\operatorname{SIANDOX}=\square T H E N O X=1: X C-0$
5017 IFOX＝1 THENGOSUBS日ED
5020 SS＝SCRN（EP（EF，1），EP（EF，2））
5030 IFSS＝32THENGUSUB5070：GOTO5055
5040 IFSS＝91 THENGUSUBS 180：GOT050S5
5052 SS＝1：PLQTEP（EF ，1），EP（EF ，2）， 93
5055 UNTIL MC＝0 OF $S S=1$ OR $\times C=35$
5060 RETURN
5070 PLOTEP（EF，1），EP（EF，2）， 93
5080 PLOTEP（EB，1），EP（EE，2）， 32
$5090 \mathrm{EF}=\mathrm{EF}+1: \mathrm{EB}=\mathrm{EB}+1$
5100 IFEF $=401$ THENEF $=1: W P=379:$ GOTO5125
5110 IFE日 $=401$ THENEB＝1
$5120 \mathrm{WP}=-1$
5125 K $\$=K E Y \$$ ：IFK $\$\rangle$＂ 4 THENGOSUES500
$5130 E P(E F, 1)=E P(E F+W P, 1)+E X: E P(E F, 2)=E P(E F+W P, 2)+E Y$
5140 IFDEEK（630）＞1000THENS 170
5150 PLOTMF（MC，1），MF（MC，2），32：MC＝MC－1
5160 DOKE630， 1600
5170 RETURN
5180 PLAY 7，0，1，2000
5190 SOUND 1，100，0
5200 SOLND 2，500， 0
5210 SOUND $3,999,0$
$5220 \mathrm{SC}=\mathrm{SC}+(10 * E P(E F, 2))$ ：GOSUB5900
5230 FORI $=1$ TOMC
$5240 \operatorname{IFMF}(I, 1)=E P(E F, 1)$ ANDMF $(I, 2)=E P(E F, 2)$ THENI $I=I$
5250 NEXTI
5260 PLOTMF（11，1），MF（II，2），32
$5276 \mathrm{X}=\mathrm{INT}($ RND $(1) * 35)+2 ; Y \approx$ INT（RND $(1) * 22)+3$
52日0 IFSCRN $(X, Y)<>32 T H E N 5270$
$5290 \operatorname{MF}(I I, 1)=X=\operatorname{MF}(I I, 2)=Y=P L \square T X, Y, 71$
5300 IFEB $>3$ THENE $=E B-3$
5320 I I＝ $0=$ DOKE 30 ，DEEK（ 630 ）+350
5330 RETURN
5500 K＝ASC（K $\ddagger$ ）
5510 IFK＝8THENE $X=-1: E Y=0$
5520 IFK $=9$ THENEX＝1：EY＝0
5530 IFK $=10 T H E N E X=0=E Y=1$
554 IFK＝11 THENE $X-E Y=1$
5550 RETURN
$5700 \mathrm{EP}(E F, 2)=E P(E F, 2)+1$
5702 TT＝DEEK（ 630 ）：GETK 5 ：GDSUB5500：DOKE $630, T T$
$5703 \mathrm{EP}(E F, 1)=E P(E F, 1)+E X$
5705 EY＝6： $0 \mathrm{X}=0 \cdot \mathrm{XC=0}$
5710 RETURN
580 IFEP（EF ，2）$=2$ THENS 7 （40
5日a5 SロUND1，1000，0：SDUND2，300，0：PLAY3， $0,1,2 \pi 00$

## ORIC PROGRAMS

## $5810 \times \mathrm{XC=XC+1:RETURN}$

 5910 RETURN
6 000 TEXT：CLS：PAPER4：INK2
6010 FORI＝0TO2：FORJ－1TOJ8：FLDTJ，I，22：NEXTJ．I
6020 PLOT1，26，23：PLOT2，26，6
6030 PLDT3，26，＂SCORE＝＂
6040 PLOT20，26，＂HIGH：＂＝PLOT26，26，HI＊
6250 FDRI＝3TO24
6060 PLOT1，I，148：PLOY 38, I，14日
6070 NEXTI
6080 FORI＝1Tロ3日：PLOTI，25，148：NEXTI
6090 FORI＝1T010
$6100 \mathrm{X}=\mathrm{INT}($ RND $(1) * 32)+4: Y=I N T(R N D(1) * 19)+4$
6110 IFSCRN $(X-1, Y)<32$ ORSCRN $(X, Y)<>320 R S C R N(X+1, Y)<>32$
THENG100
6120 PLロTX－1，Y，SF
$6130 \mathrm{X}=\mathrm{INT}($ RND $(1) * 35)+2 * Y=I N T(\mathbb{R N D}(1) * 19)+4$
6140 IFSCRN $(X, Y)<>32 T H E N 6130$

6150 PLOTX，Y， $91: \operatorname{MF}(1,1)=X: M F(I, 2)=Y$ 6160 NEXTI
6170 RETURN
7000 SC＝0：EF＝10：EB＝1：EX＝0：EY＝－1：MC＝10
$7010 \operatorname{EP}(10,1)=2: E P(10,2)=24:$ RETURN
9000 DIMEP $(400,2), T(15)$
9010 POKE\＃2GA，10：FOKE48035，0
9030 FORI＝46日089T046931
9040 READJ \＆POKEI ，J

## 9050 NEXTI


9070 FORI＝1TO15：READJ；T $(I)=J: N E X T I$
9080 RETURN
9500 DATA 12，12，18，30，33，33，45，1日
9510 DATA $0,1 日, 45,12,12,45,18,0$
9520 DATA $12,18,33,45,45,33,18,12$
9530 DATA 5，15，25，15，8，9，10，5，15，
$25,15,8,12,16,20$


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CRAMBMCOK ROAD TENTERCEN KENT 1TH3 GU: WE ML SEMO YOUR CAMES GT RETURH PDST MEE DEALES ENOUIRES WEICOME TER OSROS 473

## U.S. SCENE

## Sales sIow for IBM micto

Let's stant this week's cohmm with a Jew utems of general interest. On a seemingly confradictory note, IBM has ennounced that it expects to mcrease production of its personal compurters by abow 300 per cent this year. Af the same time, dediers selling the new PC jr. have sroted that their sales have been runhing far below expectatoms. Ifeel the main reason for this is a contradiction between the price of the tuit and ifs capabtitses.

For obvious reasons, $\overline{B M}$ did not wanf to make the machine compotibif with tis big brother the PC. Yet most dealers feel that they could setl lows more of the machmes if they came whit a better keyboard, more memory expansion capabulity, and a second dise drive. With all these limitations, coupled wifh an over- $\$ 1,000$ price tag, the machine seems to be suffering from a confusing morkef mage, Business users look to It to be used as a small busuness computer, yet the Apple dle or the Koypno (to che but fwo examples) cost less while offermg more. On the other hend, in its most basic form, the machine is still wery expensive and fimited in performance compared with orher whits destgned for use in the home.

Apparently IBM has loads of the machuner awaing shipment in verious warehouses. In order to improve sales, some dealers have been discounting $/ r$. systems as much as $\$ 300$ down from the 31,700 Itsf price, and including up to four free soffware packages. Other dealers ant offering the $\$ 609$ machine fin its most busic form) for free $f f$ the purchaser buys a complete system. It appeors as though JBM is watring to let the marketplace decte into what niche the machine wif /fin, and is also waitang to see what sort of soff ware will be developed for if. This is no sprprase as this is exacily the same approach of used when the PC was debuted

One thing is for sure: wih such a fabulous marketing budger and the nome IBM behund it, the Jirm need not oroduce the best product in order to survive. We shalf certanly see what hаррелs.

## 17-

I afways wanted to know exactly how much money schools wene spending on computers - and now I have a farly good ided. A necent study, colled Microcomputer Hardware and Soffwane in the El-Ht Markef, $1983-87$ has Just been completed by Knowledge Industry Pubhcotions, of Whie Plans, New York, The El sfands for elementary and the Hi stands for juntor and high schools, by whe way.

Among olher interesting statistics, we learn that these schools bought \$448m-worth of microcomputer equipment last year of which only $\$ 38 m$ was spent on soffware Schools purchased about 180,000 merocomputers, brimging the fotat th tuse to approxmatedy 400,000 . The study guesses that this cumtalatue lotat could rase fo as much as 2 m unts th use by the end of 1987 . Apporently mone than fwo-thirds of alf schools have af least one deskrop computer.

So whaf is th tse? Apple, Radio Shack (Tandy to you/, and Commodore supplied 87 per cent of all computers purchased by schools last year. No surprase there, I suppase. Thus sfudy, by the way, did not mentron erther the number of wems or the dollar value of compurers and software shat has been donated to schools. Now that would be an interesting statufict

That's all for this week.
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